

The Genus *Utetheisa* Hübner in Fiji with a description of a new species (Lepidoptera, Arctiidae)

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Summary

A new species of *Utetheisa* Hübner is described from Fiji. The morphology, distribution and biology of the three described *Utetheisa* species inhabiting the western Pacific is reviewed. A possible explanation of their relationship to the Asian and Papuan representatives of the genus is discussed.

Introduction

When Jordan (1939) revised and redescribed the Old World species of the genus *Utetheisa* Hübner very few specimens from the south-west Pacific were available and only a single Fijian specimen of the genus, this in the Tring Museum.

Roepke (1941) revised the Javanese species but, apparently ignorant of Jordan's work, synonymised *Utetheisa pulchelloides* Hampson with *Utetheisa lotrix* (Cramer) and described a specimen of *U. lotrix* as a new species, *indica* Roepke. Viette (1950) synonymised *indica* with *lotrix*.

Viette (1949) referred to *U. salomonis* Rothschild as *U. lotrix* (Cramer) subsp. *salomonis* Rothschild and recorded *Utetheisa pulchella* (L.) from the New Hebrides and Gambier Is. I consider that the New Hebrides and Gambier Is. "*pulchella*" are specimens of *U. lotrix stigmata* Rothschild and *U. pulchelloides marshallorum* Rothschild as Viette (1950) recorded the two latter species from the respective localities above. Viette (1950) referred to *U. salomonis* Roths. as *U. pulchelloides* Hampson subsp. *salomonis* Roths.

Fletcher (1957) recorded *U. salomonis* Roths. as a good species from Rennell and Bellona Is. (British Solomon Islands Protectorate). Comstock (1966) recorded *U. p. marshallorum* Roths. from Tutuila, American Samoa, and mentioned individuals with a somewhat different appearance from Swain's L., American Samoa. This latter observation will be mentioned again below.

Bhattacharjee and Gupta (1969) revised the Indian representatives of *Utetheisa* and recognised five sympatric species, an apparent fragmentation of *U. pulchella* (L.) at the edge of its range.

Collections of *Utetheisa* have been made on the island of Viti Levu, Fiji, by H. S. Robinson and me. A number of specimens were collected at Savusavu, central southern Vanua Levu, Fiji, in March 1970 by H. S. Robinson. On examination, the latter collection was found to be apparently divisible into three groups of specimens on the basis of wing pattern. Jordan

(1939) recorded *U. lotrix stigmata* Roths. from Fiji and one group, clearly separable from the rest in that the males possess no line of scent-hairs in the anal fold of the hindwing, is clearly referable to this species. The two other groups were both found to possess an anal fold scent-organ of apparently identical structure in the two groups and at first glance, both might be identified as *U. pulchelloides marshallorum* Roths. Indeed, one group is clearly this species, specimens of which were found by H. S. R. flying around flower-beds near the shore with *stigmata*, two hundred yards away from where specimens of the third group were collected, on or flying around a bush of *Messerschmidia argentea* (Linn. f.) Boraginaceae). Larvae collected from this same bush by H. S. R. and me in December 1969 and by H.S.R. in March 1970 produced only adults referable to this third group (H.S.R. pers. comm.). The third group differ from *marshallorum* in wing pattern, vesica ornamentation and antennal structure in the male and the shape of the female seventh sternite. This third group of specimens is described as a new species below and the characteristics of the other *Utetheisa* species inhabiting the southwest Pacific are discussed.

All type material and genitalia preparations have been deposited in the British Museum (Natural History), (B.M. (N.H.)).

Scale lines on all drawings are 1 mm.; on the plate 1 cm.

Utetheisa clareae sp.n.

Male: Wings patterned as in plate fig. 1. Forewing yellow-buff patterned with black and bright scarlet. Head and prothorax bright yellow dorsally, meso- and metathorax pale buff patterned with black. Abdomen white. Hindwing with fold in anal angle containing pale yellow scent-hairs. Antenna (fig. 1) with well-defined pectinations. Genitalia similar to *U. salomonis* Roths.; vesica with extensive scobinate area but only one group of cornuti (fig. 5). Tip of valve straight (fig. 11).

Female: Similarly patterned to the male. Seventh sternite with a narrow, elongate medial emargination posteriorly (fig. 8).

Diagnosis: Immediately separable from *U. p. marshallorum* Roths. and *U. l. stigmata* Roths. by wing pattern (compare plate figs. 1, 2 and 3) but wing pattern is similar to that of *salomonis*. Male possesses scent organ in hindwing, absent in *salomonis* and *stigmata*. Vesica with only one group of cornuti: *marshallorum* and *salomonis* have two (compare figs. 5 and 6). *Stigmata* has a single large cornutus. Tip of valve more flattened than in *marshallorum* (compare figs. 11 and 10), and similar to that of *salomonis* (compare figs. 11 and 9). Antenna of male differs substantially from *marshallorum* (compare figs. 1 and 2) but similar to that of *salomonis* (compare fig. 1 with 3 and 4.) Females are separable from those of *marshallorum* on the shape of the seventh sternite (com-

pare figs. 7 and 8).

Holotype: ♂, Fiji, Vanua Levu, Savusavu, Namale Estate, 27-29.iii.1970 (H. S. Robinson), in B.M.(N.H.).

Paratypes: ♂, 2 ♀♀, same data as holotype, in B.M.(N.H.).

Distribution: Known only from the type-locality.

Biology: Larvae feed on *Messerschmidia argentea* (Linn. f.), and were taken in large numbers on a bush just above high-water mark. The bush was always partly defoliated by the continuous-brooded larvae. No dispersal has been noted, the adults remaining firmly attached to the bush on which they developed. The individuals on a bush are thus thought to be much inbred. *M. argentea* is the foodplant of *U. p. marshallorum* Roths. throughout its range. *Marshallorum* Roths. is recorded as feeding on *M. argentea* on Viti Levu by R. H. Phillips (1937) but the specimens on which this record was based do not appear to have survived so we do not know whether Phillips' "*pulchelloides*" was *pulchelloides* or *clareae*. The foodplant of *Marshallorum* on Vanua Levu in the possibly competitive presence of *clareae* is unknown. *Messerschmidia* is the only native member of the Boraginaceae in Fiji (Parham, 1964) and *marshallorum* is not known to feed on anything but *Messerschmidia*. The colony of *clareae* at Savusava occupies two *Messerschmidia* bushes twenty yards apart. The colonies appear to be composed of only *clareae*. The origin of the day-flying specimens of *marshallorum* collected two hundred yards from the *clareae* colony is a mystery.

Remarks: Comstock (1966: 16) states:

"We also took a series of *Utetheisa* on Swain's I. which had a uniformly larger wingspan, and heavier red spots on the primaries than the Tutuila examples. This may well represent an unnamed race or subspecies of *U. pulchelloides*. The larvae were observed there feeding on the same tree, *Messerschmidia* (= *Tournefortia*), Samoan name Tausuni".

I cannot locate Comstock's specimens from Swain's I. but it is unlikely, though possible, that they might represent *U. clareae*. In Fiji *U. clareae* has a slightly smaller wingspan than *U. p. marshallorum* Roths. but its red spots are heavier. If, like *clareae*, *marshallorum* lives in discrete, inbreeding colonies, it is likely that each colony will exhibit a consistent wing pattern which could well differ slightly from that expressed in a series from a different island or even a different colony on the same island. Further observations will no doubt resolve this question and that of the problems of co-existence of two *Messerschmidia*-feeding species on Vanua Levu.

Utetheisa pulchelloides Hampson subsp. *marshallorum*
Rothschild

Hampson (1907): *Ann. Mag. nat. Hist.* (7) 19: 239.

Rothschild (1910): *Nov. zool.*, 17: 182, no. 52.

Male: A male Fijian specimen is illustrated on plate fig. 3. Forewings cream marked with black and scarlet. Hindwing with scent-organ, white marked with black. Abdomen white; head and thorax markings similar to those of *U. l. stigmata* Roths. Jordan (1939: 282) describes the subspecies and figures the male genitalia of *U. pulchelloides* subsp. *vaga* Jordan (ibidem) (258, fig. 228). The aedeagus and everted vesica are illustrated in fig. 6 and the tip of the valve in fig. 10. Jordan (1939: 285, figs. 250, 251) illustrates the antenna: the antennal segments of a Fijian specimen are shown in fig. 2.

Female: Similarly patterned to the male; illustrated by Comstock 1966, (pl. III, fig. 1). The seventh sternite is illustrated in fig. 7.

Diagnosis: Separable from *U. clareae* by its indented hindwing pattern and less dense forewing markings (see diagnosis for *clareae*). Males with hair fold in hindwing immediately separable from *U. l. stigmata*.

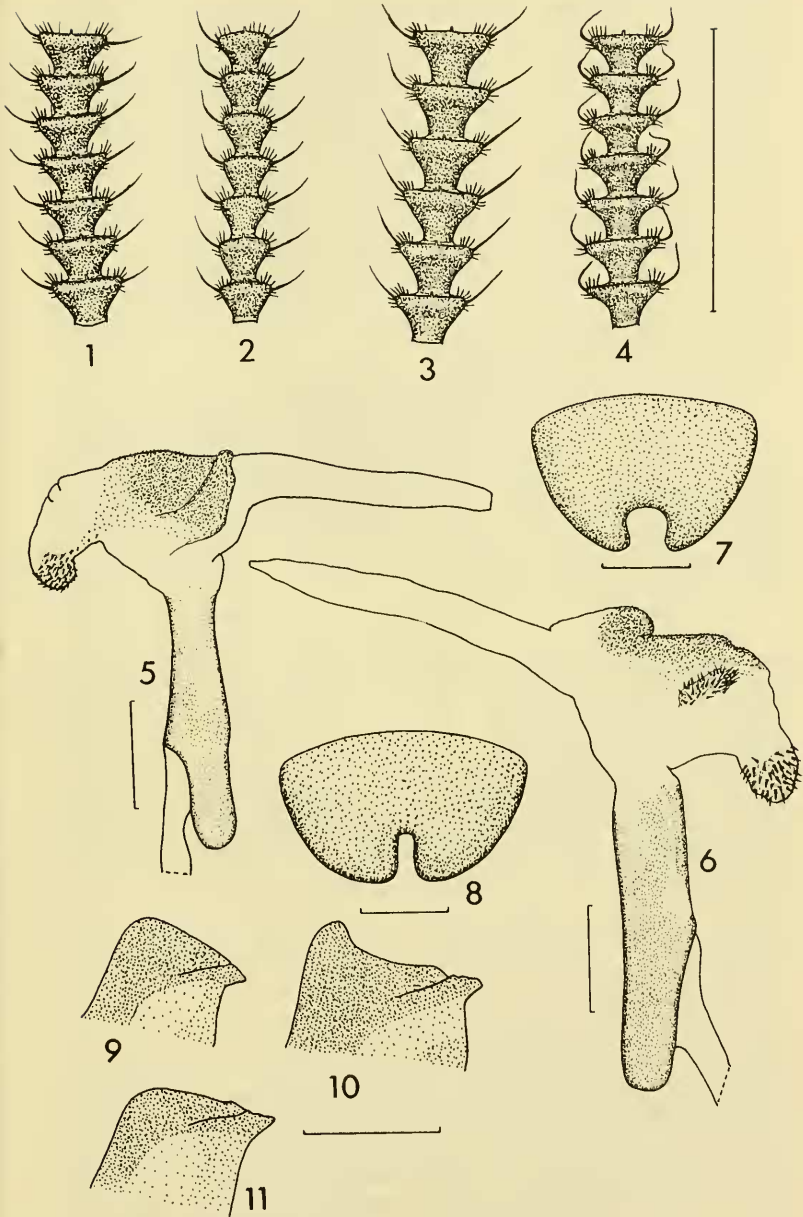
Local distribution: Known only from Savusavu, central southern Vanua Levu. This species is presumed to be present on Viti Levu from the notes made by Phillips (see above) but we have not found it.

World distribution: *U. pulchelloides* ranges eastward from Madagascar through the Oriental region forming a number of subspecies (see Jordan, 1939). *U. p. marshallorum* Roths, inhabits an arc from Wake I. and Bikini southwards through the Marshall Islands and Gilbert and Ellice Is. to Fiji and south-east to Tonga. It occurs in Samoa and the Tokelau Is. and its range extends further south-eastwards from Samoa to the Cook Is. and on to the Society Is. and Tuamotu Archipelago reaching the eastern limit of its range in the Gambier Islands.

Biology: *U. p. marshallorum* feeds on *Messerschmidia argentea* (Linn. f.) throughout its range. Comstock (1966: 16) described its life history on Tutuila, American Samoa, and illustrated the egg, larva, and pupa in colour (ibidem pl. IV, fig. 1).

Legend to figures

1. *U. clareae* sp. n. Paratype—part of ♂ antenna.
2. *U. p. marshallorum* Roths. Fiji—part of ♂ antenna.
3. *U. salomonis* Roths. Loyalty Is.—part of ♂ antenna.
4. *U. salomonis* Roths. Guadalcanal—part of ♂ antenna.
5. *U. clareae* sp. n. Holotype—aedeagus with vesica everted.
6. *U. p. marshallorum* Roths. Tokelau Is.—aedeagus with vesica everted.
7. *U. p. marshallorum* Roths. Fiji—♀ sternite VII.
8. *U. clareae* sp. n. Paratype—♀ sternite VII.
9. *U. salomonis* Roths. Loyalty Is.—tip of valve.
10. *U. p. marshallorum* Roths. Tokelau Is.—tip of valve.
11. *U. clareae* sp. n. Holotype—tip of valve.



Utetheisa salomonis Rothschild

Rothschild (1910): *Nov. zool.*, **17**: 181

Male: Illustrated by Rothschild in Seitz (1914: pl. 13k as *ruberrima*, pl. 24g as *salomonis*). Pattern extremely variable, similar to *U. clareae* but black markings much more extensive. The medial antennal segments of a male from "Guadalcanar" (Guadalcanal, British Solomon Islands Protectorate) are illustrated in fig. 4 and the corresponding segments from a specimen from the Loyalty Islands in fig. 3. The latter appear to be of slightly more robust structure, a little larger than those of the Guadalcanal specimen. Jordan (1939: 277) redescribes the species and illustrates (*ibid.*: 277, fig. 242) the valve. Viette (1950: 86) illustrates the uncus and valve. Hindwing without scent-organ but there is evidence that this character once present, has been lost (Jordan, 1939: 264). The tip of the valve is illustrated in fig. 9.

Female: Similarly patterned to the male.

Diagnosis: Characteristic wing pattern. Differs from *U. clareae* and *U. p. marshallorum* Roths. in absence of scent-organ in male hindwing. Aedeagus and vesica similar to that of *marshallorum* but tip of valve shaped differently (compare figs. 9 and 10). Antennal segments different from those of *marshallorum* (compare figs. 2, 3 and 4). Black markings much more extensive than in *U. l. stigmata* which does not have dentate male antennae.

Local distribution: Not known to occur in Fiji.

World distribution: From New Britain south-eastward to the Loyalty Islands through the Solomons and New Hebrides. Apparently not recorded from the Santa Cruz and Banks Islands or New Caledonia. All too few specimens are known of this interesting species.

Biology: Details of life history and foodplant unknown. Possibly feeds on Boraginaceae (? *Messerschmidia*) in common with *U. p. marshallorum* Roths. and *U. clareae*.

Remarks: I follow Jordan (1939) and Fletcher (1957) in considering *salomonis* as a good species.

Utetheisa lotrix (Cramer) subsp. *stigmata* Rothschild

Cramer (1777): *Pap. Exot.* ii, pp. 29 and 149, pl. 109, figs. c and f.

Rothschild (1910): *Nov. zool.*, **17**: 182, no. 48.

Male: A male Fijian specimen is figured on plate fig. 2. Forewings cream patterned with black and red; hindwing white patterned with black. Head and prothorax pale yellow marked with black; abdomen white. Jordan (1939: 289) describes the species and figures the genitalia (*ibidem*: 258, fig. 229) as does Roepke (1941: 6 and fig. c on page 3 respectively) under the name *indica* Roepke. Viette (1950: 86) figures the valve and uncus. The vesica bears a scobinate area and a single large cornutus.

Female: Similarly patterned to the male. Jordan (1939;

258, fig. 233) figures sternite VII.

Diagnosis: Apart from the highly characteristic male genitalia with the posterior ventral edge of the valve extended and clothed with stout spines and with a much wider uncus than the other three species considered here, the wing markings of *U. l. stigmata* Roths. are distinctive. The head and prothorax are a paler yellow than in *U. clareae*. The males lack the anal fold scent-organ.

Local distribution: Widespread and common on the island of Viti Levu, occurring from sea level to the highest point investigated, 1000 metres. Has been collected from Suva, Sawani, Vunidawa, Kakiraki, Lautoka, Nandi, Namaqumaqua, Nausori Highlands and Nandarivatu. Also from Savusavu, Vanua Levu.

World distribution: *U. l. stigmata* Roths. has been collected throughout the New Hebrides, New Caledonia and the Loyalty Islands. It reaches its eastern limit in Fiji. *U. lotrix* (Cramer) extends from west Africa to Fiji, forming a number of local subspecies (see Jordan, 1939).

Biology: Neither the life history nor the larva appear to have been described although *stigmata* is recorded as feeding on the following members of the Papilionaceae: *Crotalaria retusa* L., *C. mucronata* Desv., *Desmodium* spp., *Vigna marina* (Burm.) and *V. sinensis* (L.). It is said to feed on the green pods of *Crotalaria* (Veitch & Greenwood, 1921). There is a record (queried) of its feeding on *Cassia* spp. (Caesalpinaceae).

Discussion

U. p. marshallorum Roths., *U. clareae* and *U. salomonis* Roths. form a complex of closely related species. The geographical distributions of the first two overlap on the island of Vanua Levu, Fiji, where they do not interbreed. All three species are morphologically distinct. *Salomonis* is apparently geographically separated from *marshallorum* and *clareae*. *Clareae* has apparently closer affinities with *salomonis* than with *marshallorum*. *Salomonis* has lost the hindwing scent-organ present in the other two species and *clareae* has lost one group of cornuti, present in the other two species. The male antennae of *salomonis* and *clareae* are similar, reminiscent of the subspecies of *U. pulchelloides* having pectinate or strongly dentate antennae (i.e. *U. p. pectinata* Hampson— islands of the Arafura Sea; *U. p. umata* Jordan—Guam; *U. p. aphanis* Jordan— islands off south-east New Guinea). These subspecies have very restricted distributions and I consider it likely that these, with *salomonis* and *clareae*, are the remnants of an early stock which spread radially from the Papuan subregion, possessing dentate and pectinate antennae. Isolation and subsequent division of part of this ancestral stock in the south-west Pacific has resulted in the present occurrence of *salomonis* and *clareae*. Derivatives of this stock with abbreviated pectinations have been dispersed possibly from New Guinea (*U. p. papuana* Strand, the New Guinea subspecies,

has sub-dentate antennae) westward through south-east Asia (*U. p. vaga* Jordan) and across Micronesia to meet (and occasionally hybridise with) *umata* on Guam and further to the Marshall Is. and across the arc now occupied by *marshallorum*. Dispersal into Fiji of *marshallorum* possibly from Tonga or via Wallis and Futuna, has resulted in the meeting of two species, both from the same ancestral stock, but now incapable of successful hybridisation after their isolation while following different routes of dispersal.

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